

## CURRENT TRENDS IN LAPAROSCOPIC CHOLECYSTECTOMY

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لا يزال مرض حصوات المرارة مشكلة صحية بارزة في جميع أنحاء العالم . وقد كانت العملية المفتوحة لاستئصال المرارة العلاج القياسي لمدة تزيد عن مائة عام . إن إدخال استئصال المرارة بواسطة المنظار في نهاية الثمانينات أدى إلى تغييرات مثيرة في علاج مرضى حصوات المرارة. إن الهدف من هذه المراجعة هو تزويد الطبيب العام بالإجابات عن الأسئلة التي ربما يطرحها المريض بخصوص المعالجة الحالية لحصوات المرارة.

**الكلمات المرجعية:** استئصال، المرارة، المنظار.

*Gallstone disease is still a major health problem worldwide. Open cholecystectomy was the standard treatment for symptomatic gallstones for more than 100 years. The introduction of laparoscopic cholecystectomy in the late 1980s has led to dramatic changes in the management of gallstone disease. The aim of this review is to equip the general practitioner with the answers to questions a patient may ask about the current management of gallstones.*

**Key Word:** Laparoscopy, cholecystectomy

### INTRODUCTION

Gallstone disease continues to be one of the most common digestive disorders worldwide. The prevalence of gallstone formation increases with age.<sup>1</sup> In the past few years, ultrasound data on gallstone prevalence have been reported.<sup>2-8</sup> In the United States, the reported incidence of gallstones is approximately 10% to 15%, with another one million new cases diagnosed annually.<sup>9,10</sup>

Although the actual incidence of gallstones in Saudi Arabia is unknown, open cholecystectomy (OC) was the most common major abdominal procedure performed in the Kingdom.<sup>11</sup> Since it was first successfully performed in 1987,<sup>12</sup> laparoscopic cholecystectomy (LC) has rapidly become the standard treatment for symptomatic gall-

stones. It is already well established in Saudi Arabia.<sup>13,14</sup>

The major aim of this review is to outline the impact of LC on the management of gallstones, focusing on symptomatology, indications, contraindications, complications, and cost of cholecystectomy.

### SYMPTOMATOLOGY

The symptoms of gallstone disease overlap with those of several other disorders and are therefore nonspecific. Most patients present with an intermittent right upper abdominal pain that may radiate to different sites, and it usually occurs at midnight.<sup>15-17</sup> Biliary pain may last from 1 to 24 hours; the average is 1 to 5 hours.<sup>16,17</sup> Compared with renal colic, the pain is mild and easily relieved by analgesics.<sup>17</sup> It is worth

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mentioning that the term colic and the classic postprandial association are misnomers.<sup>15,17</sup>

The clinician's dilemma is occasionally compounded by the coincidental discovery of gallstones in a questionably symptomatic patient or in a persistently symptomatic patient without demonstrable gallstones. Many diagnostic tools have been developed to assist in the decision-making process. However, it cannot be overemphasized that the clinical history is still the most important factor, not tests.<sup>18,19</sup>

### **HISTORICAL PERSPECTIVES**

Open cholecystectomy, first performed by Carl Langenbuch in Berlin in July 1882,<sup>20</sup> was the standard surgical treatment for symptomatic gallstones for more than a century.<sup>21</sup> It was second only to cesarean section as the most common major abdominal operation in the United States.<sup>9</sup>

The morbidity and the relatively long hospitalization and convalescence period associated with OC have led to several alternative treatments for symptomatic gallstones including stone dissolution, lithotripsy and percutaneous stone removal.<sup>22-30</sup> These non-operative therapeutic options, however, are only proven effective in a small number of patients and leave the gallbladder in situ with 50% to 61% incidence of stone recurrence.<sup>31-34</sup>

### **LAPAROSCOPIC CHOLECYSTECTOMY AS THE GOLD STANDARD TREATMENT FOR GALLSTONES**

Laparoscopic cholecystectomy was first performed in Lyon, France in March 1987 by Phillipe Mouret.<sup>12</sup> In the history of surgery, very few operations have changed the thinking and operating habits of surgeons as rapidly and broadly as LC. This

technique has rapidly emerged as the gold standard treatment for patients with symptomatic gallstones.<sup>35-43</sup>

Advantages of LC over traditional OC include less postoperative pain, improved cosmetics, shorter hospital stay, rapid return to normal activities and work, and less cost.<sup>10,37,39,41,43-45</sup> In 1991, Chesly-Curtis and Russell<sup>34</sup> reviewed the available treatments for gallstones (Table 1). Within a short period, LC rendered all of these almost obsolete.

### **INDICATIONS AND CONTRAINDICATIONS**

The indications for LC are similar to those for OC, i.e., symptomatic gallstones.<sup>46</sup>

Most people with gallstones are asymptomatic and remain that way.<sup>47,48</sup> Less than 5% of the 20 million individuals with gallstones in the United States experience symptoms in any year.<sup>49-51</sup> Management of patients with asymptomatic gallstones remains controversial. Earlier studies have concluded that OC is not indicated for such patients.<sup>51-54</sup> The advent of LC has reopened the debate regarding appropriate clinical strategy in this patient population. Although LC has been performed on patients with asymptomatic gallstones,<sup>55,56</sup> clinical evidence, however, suggests that prophylactic LC should not be routinely recommended for patients with asymptomatic gallstones.<sup>48</sup>

Initially, conditions such as acute cholecystitis, common bile duct (CBD) stones, cholecystoenteric fistula, previous abdominal surgery, and morbid obesity were believed to be contraindications to LC.<sup>37,57</sup> With increasing experience, however, difficult operations are being attempted.<sup>58</sup>

Although acute cholecystitis is a known risk factor for morbidity and mortality in OC,<sup>59</sup> several reports on successful LC in

**Table 1: Therapeutic options for gallstones (after Cheslyn-Curtis and Russell<sup>34</sup>)**

Therapy	% Suitable	% Efficacy	Notes
Oral dissolution	10	40-60	50% recurrence rate
Extracorporeal shockwave lithotripsy	< 15	90	Recurrence ?
Percutaneous cholecystectomy	-	-	-
Percutaneous transhepatic methyl tert-butyl ether infusion	-	50-96	High complication rate
Percutaneous cholecystolithotomy	-	89	Recurrence ?
Laparoscopic cholecystolithotomy	-	-	-
Minicholecystectomy with later radiological stone removal	70	85	-
Minicholecystectomy	-	-	-
Laparoscopic cholecystectomy	-	-	-

**Table 2: Results of laparoscopic cholecystectomy**

Reference	No. of patients	% Conversion*	% Morbidity	% Bile duct injury	% Mortality
82	3,708	7.3	3.5	0.18	0.13
83	12,397	4	4	0.3	0.08
84	77,604	-	2	0.59	0.04
85	4,640	6.9	4.7	0.3	0.13
86	5,607	8.08	6.87	0.57	0.04
87	9,054	9.8	6.09	0.41	0.13
88	5,913	13.9	-	0.6	-

\* Conversion from laparoscopic to open cholecystectomy

patients with acute cholecystitis have been published.<sup>58,60-65</sup> In a recent prospective study comparing the outcome of open and laparoscopic cholecystectomy, the frequency of serious complications was highest when patients with acute cholecystitis had the open procedure.<sup>66</sup> Hence, patients with this condition should not be denied the advantages of LC when the necessary experience is available.

Morbid obesity is no longer a contraindication and, indeed, the obese patient does relatively better after laparoscopic than open cholecystectomy.<sup>67,68</sup>

The detection and treatment of CBD stones, present in 9% to 16% of patients with gallstones,<sup>69</sup> is still controversial. Most surgeons and gastroenterologists use endoscopic retrograde cholangiopancreatography to diagnose and remove CBD stones before

LC.<sup>40,70</sup> In a few centers, however, expertise in laparoscopic CBD exploration is available.<sup>69,71-74</sup>

In addition, successful laparoscopic resection of a cholecystocolic fistula has been reported.<sup>75</sup>

The current list of contraindications to LC has diminished to two: first, anesthetic risk (although successful LC has been done under epidural anesthesia);<sup>76</sup> and second, gallbladder malignancy.<sup>77</sup>

Recently, the indications have been expanded to include cirrhotic patients with severe bleeding tendency<sup>78</sup> and pregnant patients with symptomatic gallstones.<sup>79,80</sup>

Most surgeons now, including the author, advocate LC for all patients.<sup>81</sup>

## RESULTS OF LC

Table 2 illustrates the conversion rate, overall morbidity, percentage of bile duct injury and mortality rate reported from larger series.<sup>82-88</sup>

### Conversion from laparoscopic to open cholecystectomy

In some cases, cholecystectomy cannot be completed laparoscopically and conversion to OC is necessary.<sup>38,40,43,63,84,89,90</sup> Conversion from LC to OC is neither a failure nor a complication of laparoscopic operation, but an attempt to avoid serious complications, when factors that prevent the completion of LC are identified at the time of operation.<sup>90</sup> Conversion rates vary from 2.9 to 13.9%, with an average of 5%.<sup>37-40,45,91-97</sup> Reasons for conversion include unclear anatomy as a result of adhesions or acute inflammation, iatrogenic injuries, and unexpected operative findings.<sup>91</sup>

### Morbidity

The morbidity of LC is worthy of comment. Large series have reported an overall low rate of complications compared with OC.<sup>40,84,86,88,98,99</sup> Buanes and Mjaland<sup>66</sup> prospectively compared the outcome of open and laparoscopic cholecystectomy and described an overall lower complication rate in the laparoscopic group (9% versus 16%).

Laparoscopic cholecystectomy is, however, associated with a significant increase in bile duct injury compared with OC.<sup>40,84,86,88,99,100</sup> In addition, bile duct injuries during LC are more severe and difficult to correct than those associated with the open procedure.<sup>88</sup>

Certain complications, which may be lethal, are unique for LC, i.e., visceral and vascular injuries, and gas embolus.<sup>84,86,87</sup> Fortunately, these complications are rare

provided surgeons are aware of them and take the necessary precautions.

### Mortality

Two comprehensive studies, the first including 42,474 patients undergoing OC,<sup>101</sup> the other 77,604 patients operated laparoscopically,<sup>84</sup> reported a 0.17% mortality after the open procedure versus a rate of 0.04% after LC.

Furthermore, recent studies confirmed that LC carries lower mortality rate than the open procedure.<sup>66,99</sup>

### Length of hospital stay and return to normal activity

There is no doubt that a successful LC is associated with minimal trauma than the open procedure, resulting in less postoperative pain, a shorter hospital stay and rapid return to normal activity and work.<sup>39-41,102</sup> Hospital stay after LC is 0.89-1.6 days<sup>87,103</sup> compared with 6 days after OC.<sup>66</sup> Laparoscopic cholecystectomy, indeed, can be safely performed on an outpatient basis in selected patients.<sup>104,105</sup>

Absence from work is 6-8 weeks after OC,<sup>9,39</sup> while patients who undergo LC can resume full activity after 7-14 days.<sup>43,66,103</sup>

### Expense

Controversy still exists regarding the cost of LC. This probably reflects difficulty and differences in calculating the total expenses of the procedure. Several reports, however, have shown lower hospital costs for laparoscopic than for open cholecystectomy.<sup>106-109</sup> A recent study from Sweden<sup>110</sup> found the hospital costs for OC to be less compared with LC, however, in respect to society, LC was a cost-saving procedure. Several factors are responsible for the differences between these studies including the use of different

equipment, i.e., disposable versus reusable, electrosurgery versus laser.

## CONCLUSION

Gallstone disease remains a major health problem worldwide. LC is now the gold standard treatment for patients with symptomatic gallstones. Undoubtedly the greatest advantages for the patient and society from the use of LC are short hospital stay (less than 2 days), and rapid return to normal activity and work (1-2 weeks) compared with 6-8 weeks after OC. Laparoscopic cholecystectomy is also safer and less costly than the open procedure, with lower morbidity and mortality rates. Conversion from LC to OC is expected in about 5% of the cases. The increased incidence of CBD injury during LC is of concern, however, as surgeons gain more experience in the technique this is expected to decrease.

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